

## Three New Gall-Inducing *Callirhytis* Foerster from *Quercus cedrosensis* Muller

(Hymenoptera: Cynipidae)

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The cynipid fauna on the oak *Quercus (Protobalanus) cedrosensis* Muller, had not been studied since its description (Muller, 1962). *Quercus cedrosensis* occurs in only a few small, highly localized populations on the west slope of the Sierra San Pedro Martir and along the Pacific Coast, Baja California, Mexico. This paper includes three new unisexual generations in the genus *Callirhytis*.

### *Callirhytis cedros*, new species

Unisexual Generation Female Holotype. — Head: coriaceous, sparsely pubescent; from above transverse; narrower than thorax; cheeks not broadened behind eyes; occiput raised above contour of head; malar space 0.4 times eye height, not grooved; antennae filiform, 14 segmented, segment 1 longer than 2, segment 3 less than 1 plus 2 but longer than 4, 14 slightly longer than 13. Thorax: mesoscutum with nearly contiguous setaceous punctures, setae not obscuring scutal sculpture, broader than long; anterior parallel lines distinct, 0.3 times mesoscutum length; notaulices complete, sharp edged, shiny, weak anterior of parapsides; parapsidal lines 0.6 times mesoscutum length from posterior; median groove short, weak, length less than width of area between notaulices posteriorly; scutellum rugose, pubescent; fovea smooth, bare, polished, separated by low ridge; mesopleuron anterodorsally dull, microcoriaceous, ventrally aciculate, dorsoposteriorly smooth, shiny, sparsely seto-punctate near wing. Wing hyaline, margin ciliate, veins yellow-brown, radial cell open, aerolet 0.17 times cubital cell length. Claws simple. Abdomen: propodeum wrinkled; longer than head plus thorax, two tergites visible in dorsal view with tergite II smooth, polished, micropunctate, sparsely pubescent anterolaterally; ventral spine 3 times as long as high or wide, evenly tapered, slightly bristly. Mesonotum length 0.9 times, antennae 2.1 times, and wing 3.6 times maximum head width. Length 2.4mm. Body dark red-brown, appendages brown.

Variation — Unknown. Only 2 specimens reared.

Host. — *Quercus cedrosensis* Muller.

Gall. — Detachable, monothalamous, stem or aborted bud gall. Spherical, dark brown, 6mm in diameter (Fig. 1).

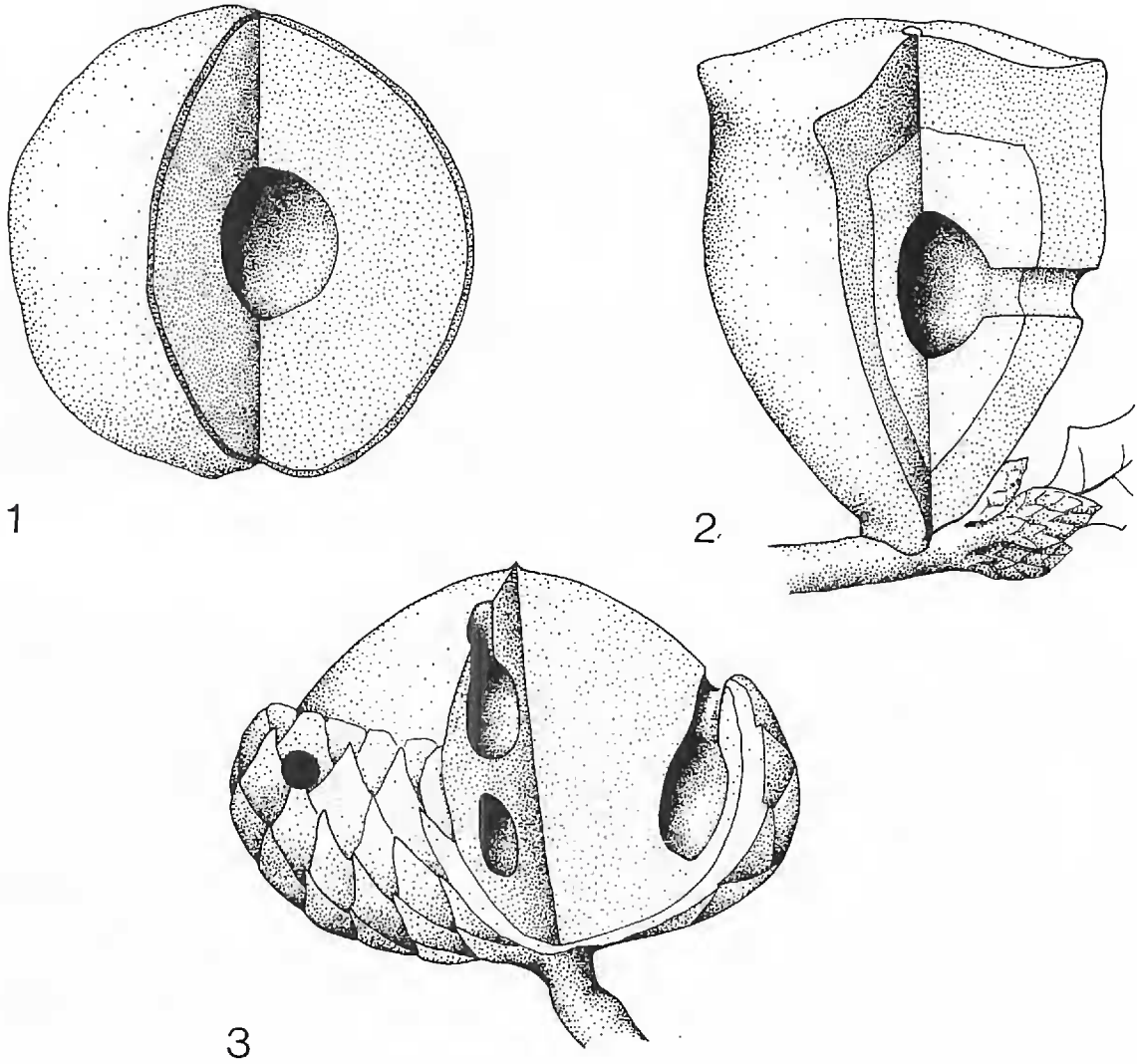
Biology. — Galls were collected in December 1973 and two insects emerged in February and March, while being maintained indoors. Oviposition site is unknown.

Distribution. — The holotype female emerged in late February 1974 from a gall collected on Cedros Island, Baja California, Mexico by David Cavagnaro in December 1973. There is no other location known for this insect.

Type deposition. — Holotype female and gall in United States National Museum. Paratype female and gall in California Academy of Science. Other paratype galls in senior author's collection.

### *Callirhytis cedrosensis*, new species

Unisexual Generation Female Holotype. — Head: reticulate; from above transverse; slightly narrower than thorax; cheeks not widened behind eyes; occiput elevated above contour of head; malar space 0.6 times eye height, not grooved; antennae filiform, 14 segmented, segment 1 longer than 2, segment 3 longer than 1 plus 2 or 4, 14 one and one-third times length of 13. Thorax: mesoscutum weakly and irregularly rugose throughout, as broad as long, sparsely pubescent; anterior parallel lines distinct, 0.5 times length of



Figs. 1-3 Galls of *Callirhytis* spp. Fig. 1. *cedros* new species, 7 x. Fig. 2. *cedrosensis* new species, 7 x. Fig. 3. *protobalanus* new species, 9 x.

mesocutum; notaulices sharp edged, sculptured posteriorly, complete but progressively more narrow and weak anteriorly; parapsidal lines distinct, from posterior 0.5 times mesoscutum length; median groove sharp edged, 0.25 times mesoscutum length; scutellum reticulate, sparsely pubescent; fovea smooth, polished, bare, sharply outlined, separated by ridge; mesopleuron aciculate. Wing hyaline, margin ciliate, veins yellow-brown, radial cell open, aerolet 0.25 times length first cubital cell. Claws simple. Abdomen: propodeum rugose; length equal to head plus thorax, tergite II smooth, polished, bare dorsally, pubescent anteriorlaterally, ventral spine 1.5 times as long as high or wide, slightly bristly. Mesonotum length 1 times, antennae 2.5 times, and wing 5 times maximum head width. Length 3.2mm. Head, antennae, thorax, legs, and abdomen yellow-brown, abdomen darkest dorsally on tergite II; thoracic lines, except notaulices, and most sutures dark brown.

Variation. — Cedros Island specimens with reticulate sculpturing on median foveal ridge. Length of 59 specimens 2.9-3.5mm, average 3.3mm.

Host. — *Quercus cedrosensis* Muller.

Gall. — Detachable, monothalamous, stem galls. Flat-topped, with small elevated central disk, ovoid, green and succulent when fresh, brown to purple when dry, 0.8 to 1.5cm tall, 1.2 cm average, 1.0cm diameter. Galls collected from Cedros Island are more rounded apically and without sharply ridged flattened top (Fig. 2).

Biology. — Insects emerged in January 1972 from galls collected 30 December 1971 and maintained indoors. The location of the galls suggests that the eggs must have been

laid in terminal or axillary buds on first year wood. Oviposition site of unisexual generation is unknown.

Distribution. — The holotype female was collected 12 miles southeast of Ensenada, Baja California, Mexico by C. Dailey (#1201) 30 December 1971. Paratype galls were collected on Cedros Island, Baja California, Mexico by David Cavagnaro in December 1973 and yielded insects during February and March while being maintained indoors. Similar galls were collected 9.7 km (6 miles) southwest of San Vicente, Baja California, Mexico.

Type deposition. — Holotype female and gall in United States National Museum. Paratype insects and galls in United States National Museum (2), California Academy of Science (2), University of California — Davis (2), Weld collection in possession of R. J. Lyon at Los Angeles City College (2) and the authors' collection.

### ***Callirhytis protobalanus*, new species**

Unisexual Generation Female Holotype. — Head: reticulate; from above transverse; slightly narrower than thorax; cheeks widened behind eyes; occiput slightly elevated above contour of head; malar space 0.3 times eye height, not grooved; antennae filiform, 13 segmented, segment 1 longer than 2, segment 3 longer than 4 but less than 1 plus 2, 13 twice length of 12. Thorax: mesoscutum coriaceous throughout, as broad as long, sparsely pubescent; anterior parallel lines distinct, 0.5 times mesoscutum length; notaulices complete, broadest posteriorly; parapsidal lines distinct, from posterior 0.5 times mesoscutum length; median groove, short, weak; scutellum reticulate, sparsely pubescent; fovea indistinct, sculptured, not separated by a ridge; mesopleuron aciculate. Wing hyaline, margin ciliate, veins yellow-brown, radial cell closed, aerolet 0.16 times first cubital cell length. Claws simple. Abdomen: length equal to head plus thorax, propodeum smooth, polished, bare; tergite II smooth, polished, bare dorsally, sparsely pubescent anterolaterally; ventral spine long, slender, 10 times as long as high or wide, slightly bristly. Mesonotum length 1.3 times, antennae 2.2 times, and wing 3.8 times maximum head width. Length 1.8mm. Color of head, thorax, abdomen, antennae, and legs, brown; abdomen dark brown to black dorsally, parts of some pleural sutures black.

Variation. — Length of 12 specimens 1.7-1.9mm, average 1.8mm.

Host. — *Quercus cedrosensis* Muller.

Gall. — Integral polythalamous acorn gall formed in cotyledon of the acorn 1.0 to 2.0cm wide, 1.2cm average. Emergence occurs through hull and sometimes through cap (Fig. 3).

Biology. — Galls maintained indoors yielded adults 2-5 January 1972 from galls collected 30 December 1971. Oviposition site unknown.

Distribution. — The holotype female was reared from a gall collected about 12 miles southeast of Ensenada, Baja California, Mexico by C. Dailey (#1201) on 30 December 1971. Similar galls have been collected 9.7 km (6 miles) southwest of San Vicente, Baja California, Mexico.

Type deposition. — Holotype female and gall in United States National Museum. Paratype insects and galls in United States National Museum (2), California Academy of Science (2), University of California — Davis (2), Weld collection in possession of R. J. Lyon at Los Angeles City College (2) and the authors' collections.

### Key to Cynipid Fauna on *Quercus cedrosensis*

1. Cheeks not broadened behind eyes. . . . . 2  
    Cheeks broadened behind eyes . . . . . *Callirhytis protobalanus*
2. Ventral spine 3 times as long as high or wide . . . . .  
    . . . . . *Callirhytis cedros*  
    Ventral spine 1.5 times as long as high or wide . . . . .  
    . . . . . *Callirhytis cedrosensis*

### Acknowledgement

The authors are grateful to David Cavagnaro for providing galls which yielded the *Callirhytis cedros* specimens and some paratypes of *Callirhytis cedrosensis*. The gall illustrations were prepared by M. Lynn Siri.

### Literature Cited

- Muller, Cornelius H. 1962. A new Species of *Quercus* from Baja California, Mexico. Madrono 16(6) : 186-192.
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### SCIENTIFIC NOTE

**Observations on Spider Predation of Early Instar Larvae of Douglas fir Tussock Moth, *Orygia pseudotsugata* (McDunnough) (Lepidoptera: Lymantriidae)** — In June 1972, studies of Douglas fir tussock moth egg eclosion and larval dispersal in relation to host phenology were conducted near Iron Mountain, El Dorado County, Calif. (Wickman, Boyd E. 1976, Environ. Entomol. 5:316-322.) During the course of this work certain Douglas fir tussock moth egg masses in the lower crown foliage of white fir, *Abies concolor* (Gord. & Glend.) Lindl., were repeatedly visited and observations made to record egg eclosion. During one such visit on June 2 at 0830 PDT, a medium-size spider (about 6-8 mm long) was seen on its web immediately adjacent to an egg mass consuming a 1st-instar larva. The spider repeatedly went from the web onto the egg mass and back to the web. I watched for about 5 min., as the spider darted to the egg mass and extracted another newly emerging larva, evidently paralyzed it with a bite, and deposited it in the web. I waited for the spider to eat the larva, but instead, some minutes later it again pounced on the egg mass and extracted another larva and repeated the action. I continued watching for another 15 min., but the spider did not attack the egg mass again, nor did it feed on its two dead or paralyzed larvae in the web.

I marked the egg mass, intending to visit it during my periodic visits to see if I could determine the effects of spider predation on that particular egg mass. On my next visit at 0900 on June 4, the egg mass was covered with newly hatched larvae, and the spider was never seen again during my visits over the next 2 weeks. In the course of repeated observations of more than 80 separate egg masses during the first 2 weeks of June 1972, similar size spiders and webs were found immediately adjacent to or near 12 egg masses. One additional spider was observed trying to open an unhatched egg. After several minutes it gave up and returned to its web. The spiders were gone at the end of the sampling period and unfortunately were not collected.

Similar observations of egg masses were made in the Blue Mountains of eastern Oregon in 1973. On May 27, at Frizzel Creek, 900m elevation, on 2 separate occasions medium-size spiders (5-8 mm) were seen opening Douglas fir tussock moth eggs on Douglas-fir (*Pseudotsuga menziesii* (Mirb.) Franco), and eating the fully formed larvae which were ready to emerge. In both cases the egg masses were surrounded by webs.

I do not know the total effect of predation by these spiders, but such losses obviously occur during egg eclosion and to early instar larvae. This type of mortality is difficult to measure but may be an important source of population reduction, especially during the several-day interval between eclosion and the time larvae disperse to new foliage for food. During this predispersal period many larvae remain congregated on egg masses and are thus concentrated and more vulnerable to this type of predation. The magnitude of early larval mortality by spider predation is unknown but probably constant; it should be included in life table studies and ultimately in population models of Douglas fir tussock moths. — BOYD WICKMAN, Pacific Northwest Forest and Range Experiment Station, USDA Forest Service, Corvallis, Oregon.